A STUDY OF MATERNAL FACTORS INFLUENCING VERY LOW BIRTH WEIGHT BABIES

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CERTIFICATE

This is to certify that dissertation entitled **"MATERNAL FACTORS INFLUENCING VERY LOW BIRTH WEIGHT BABIES"**, is a bonafide original work of Dr.M.S.MANI, Post-Graduate Student, 2003-2006 batch in partial fulfillment of the requirements for M.D.Branch – VII (Paediatrics) Examination of the Tamil Nadu Dr.M.G.R. Medical University to be held in September 2006.

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DECLARATION

I, **Dr.M.S.MANI**, solemnly declare that this dissertation entitled, **"MATERNAL FACTORS INFLUENCING VERY LOW BIRTH WEIGHT BABIES"**, is a bonafide work done by me at Government RSRM lying-in-hospital during January 2005 to December 2005 under the guidance and supervision of my Professor **Dr.L.UMADEVI, M.D., D.C.H.,** Institute of Social Paediatrics. The dissertation is submitted to Tamil Nadu Dr.M.G.R Medical University, towards partial fulfillment of requirement for the award of M.D. Degree (Branch VII) in paediatrics.

Place:

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CONTENTS

INTRODUCTION

Weight of the newborn is a universal undisputed predictor of healthy infancy and childhood. The risk of perinatal and infant mortality rates are greater among the low birth weight infants. In addition to increasing risk of mortality, low birth weight is also found to be associated with morbidity and long term developmental problems among those babies who survive.

The incidence of low birth weight in a given population reflects its socio-economic - development and it can also be used as a good indicator of mother's nutritional status.

The world Health Organization has defined low birth weight as babies weighing less than 2500 gm's at birth, irrespective of their gestational age. In developed countries the incidence of low birth weight is less than 10% whereas in developing countries it is in the range of 15-30% of the total birth. In India about 30% of babies born are of low birth weight. Out of this 30% , 10% is due to preterm deliveries and the remaining is due to Intrauterine Growth Retardation.

WHO in 1995 estimated that 142 million babies were born in the world, out of which 25 million are low birth weight and 19 million of these babies were born in the developing countries (33). Every fourth baby in India is low birth weight baby accounting for a high load of morbidity and mortality. Every year 8 million low birth weight babies, 2.7 million preterm babies and 1 million very low birth weight babies are born in India.

Due to improvement in health facilities and improvement in people's standard of living all over the world, the mortality and morbidity rates of low birth weight infants have been substantially reduced over the past years. Now the major concern, lies in reducing the mortality and morbidity rates of infants weighing less than 1500 gms (very low birth weight) at birth.

In developed countries because of improvement in health care facilities, and increased funds spent for health, the problem of very low birth weight has been reduced. But in developing country like India, where there is lacunae in health care facility and funds, the survival and long-term complications of very low birth weight babies still remains the challenge.

The high incidence of neonatal morbidity and mortality in our country is due to neglect of nutrition, health and education of female children and poor status and empowerment of women in society. Early teenage marriages, frequent preganancies, maternal malnutrition, fewer antenatal consultations, bad obstetric history, medical diseases complicating pregnancy and maternal infections are important contributory factors for the increased incidence of very low birth weight in India.

There are various studies relating socio-demographic maternal factors in association with low birth weight. But only very few studies has been dealt with very low birth weight and maternal factors. Keeping all these in view, an attempt has been made to carry out a study on maternal factors, associated with very low birth weight babies (birth weight less than 1500 gms) at RSRM lying in Hospital, Stanley Medical College, Chennai.

REVIEW OF LITERATURE

Few medical specialities have experienced the amount of progress in medical care and impact on overall patient survival than neonatology over the part two decades. Improvements in technology, greater use of prenatal glucocorticoids and surfactant replacement therapy, better regionalization of perinatal and high-risk neonatal care, and a more comprehensive understanding of the physiology of the immature infant have all contributed to dramatic increase in survival of very preterm infants. Care of the premature infants with birth weight less than 1500 gm is still a major hurdle in developing country like India.

Very low birth weight infants present one of the greatest medical and ethical challenges to the medical field. Although they represent a small percentage of overall birth and NICU admissions, very low birth weight infants are often the most critically ill and at the highest risk for mortality and long-term morbidity of any NICU patients. They also contribute disproportionately to overall hospitals days and consume a large percentage of NICU, personal time, effort and costs of care. Care of these infants is in constant evolution owing to new discoveries in both basic and clinical research as well as to growing clinical experiences.

Importance of Birth Weight

Birth weight is a single most important marker of adverse perinatal, neonatal and infantile outcome. Over 80% of all neonatal deaths in both developed and developing countries occur among the low birth weight babies. Low birth weight is also a major determinant of malnutrition during infancy because over 40% of low birth weight babies are malnourished at one year of age. Birth weight is an important determinant of success and duration of breast feeding which is a well known protective assert against infant deaths in the developing world.

It is estimated that in the developing country low birth weight infants have 2.3 times increased risk of mortality due to infections and three times increased risk of neuro-developmental sequelae of birth asphyxia compared to the normal weight counterparts.

What is very Low Birth Weight ?

Very low birth weight is a term used to describe babies who are born weighing less than 1500 gms and they are predominately premature. Babies with very low birth weight look much smaller than other babies of normal birth weight. A very low birth weight babies head appears to be bigger than the rest of the body and he/she often looks extremely thin with little body fat. The skin is often quiet transparent allowing the blood vessels to be easily seen.

In India, Birth weight less than 2,500 gms constitutes around 30%. In this 20% is due to Intra-uterine growth retardation and 10% is preterm. Very low birth weight infants constitutes around 2-3%.

What causes very low birth weight ?

The primary cause of very low birth weight is premature birth (born before 37 weeks gestation) (38) Very low birth weight babies are often born before 30 weeks of pregnancy. Being born early means a baby has less time in the mother's Uterus to grow and gain weight. Much of a babies weight is gained during the later part of pregnancy.

Another cause of very low birth weight is Intra-Uterine growth restriction. This is when a baby does not grow well during pregnancy because of problems with the placenta, the mother's health or birth defects. Most very low birth weight babies who have Intra uterine growth retardation are also born early and are both very small and physically immature.

Who is affected by very low birth weight ?

Any baby born prematurely is more likely to be very small. However there are other factors that can also contribute to the risk of very low birth weight.

These include

1. **Race - African** - American babies are twice as likely to have very low birth weight than caucasian babies. (19) (7).

2. **Age** - teen mother's (especially those younger than 15 years old) have much higher risk of having a baby with very low birth weight.(35)

3. **Multiple birth** - Multiple birth babies are at increased risk of very low birth weight. Because they often are premature. About 10% of twins and one third of triplets have very low birth weight. (38)

4. **Mother's health** - women who are exposed to drugs, alcohol and cigarettes during pregnancy are more likely to have low or very low birth weight babies (42). Mother's of lower socio-economic status (39) are also more likely to have poor pregnancy nutrition (15), inadequate prenatal care, and pregnancy complications - all factors that can contribute to very low birth weight.

5. **Illiteracy,** (24) Hard labourer, poor family atmosphere, (16) decreased birth interval (18) previous history of bad obstetric history (27) and poor pre-pregnancy nutrition (20) also contributes to very low birth weight.

Why is very low birth a concern?

A baby with very low birth weight is often at increased risk for complications. The babies tiny body is not as strong and he/she may have a harder time eating, gaining weight and fighting infection. Because they have so little body fat, very low birth weight babies often have difficulty staying warm in normal temperatures.

Because many babies with very low birth weight are also premature it can be difficult to separate their problems due to prematurity from the problems of just being so tiny. In general the lower the babies birth weight, the greater the risks for complications.

The following are some of the common problems of very low birth weight babies.

- Low oxygen levels at birth, birth asphyxia
- Inability to maintain body temperature
- Difficulty feeding and gaining weight
- Infection
- Breathing problems such as respiratory distress syndrome due to immature lungs, Apnoea of prematurity, pulmonary hemorrhage, congenital pneumonia, BPD.
- Neurological problems such as Intra-ventricular hemorrhage (HIE, Seizures, Retinopathy of prematurity, Hypotonia, drug withdrawal).

- Gastro - intestinal problems such as necrotizing enterocolitis.
- Hematologic problems (anaemia, hyperbilirubinemia, DIC, Vitamin K deficiency, Hydrops.
- Renal immaturity (Hyponatremia, Hypernatremia, Hyperkalemia).
- Toxicity of drugs.
- Cardiovascular - PDA, Brady cardia with Apnoea, Hypotension.
- Metabolic - Hypocalcemia, Hypoglycemia, Hyperglycemia, late metabolic acidosis.
- Sudden infant death syndrome (SIDS).

Nearly all very low birth weight babies need specialized care in the neonatal intensive care unit until they can gain weight and are well enough to go home. Generally the smaller the baby, the higher the risk. The survival of these tiny babies is directly related to their weight at birth.

Risks for long-term complications and disability are increased for babies with very low birth weight. They are

- Cerebral palsy
- Mental retardation
- Blindness
- Deafness
- Undernourishment
- Impaired physical work capacity.

- Atherosclerotic coronary artery disease, Hypertension and diabetes mellitees during Adult life.

How is very low birth weight diagnosed ?

During prengnacy, babies birth weight can be estimated in different ways. The height of the fundus (the top of the mother's uterus) can be measured from the pubic bone. This measurement in centimeter usually corresponds with the number of weeks of the pregnancy after the 20th week. If the measurement is low, for the number of weeks, the baby may be smaller than expected. Ultrasound is a more accurate method of estimating fetal size. Measurements can be taken of the fetus head, femur length and abdomen and compared with the growth chart to estimate fetal weight.

Babies are weighed within the first few hours after birth. The weight is compared with the babies gestational age and recorded in the medical record. Babies weighing less than 1500 gms at birth are considered as very low birth weight.

Treatment for very low birth weight:

Specific treatment for very low birth weight babies will be determined by.

- Babies gestational age overall health and medical history.

- Special attention should be paid to the following

- Warmth and Drying
- Care after resuscitation
- Fluids and Electrolytes
- Skin care
- Cardio vascular support
- Vitamin supplementation
- Surfactant therapy, ventilatory support,
- Blood transfusions, depending on infants condition.

Prevention of very low birth weight

Because of the tremendous advances in care of sick and premature babies, more and more babies are surviving despite being born early and being born very small. However prevention of preterm births is one of the best way to prevent very low birth weight.

Previously birth weight was considered to be determined by genetic and ethnic factors. Later studies have shown that fetal growth and development, to a great extent are influenced by factors such as mother's inadequate nutrition (15), chronic diseases, abuse and hard physical work (42). Recently number of studies have demonstrated association between low birth weight with maternal, poor socio-economic conditions, obstetric factors and anthropometric factors (21) (29) (36).

Birth weight may be a highly sensitive marker of family socio-economic circumstances during gestation and their of future socio-economic carrier as well as the biological outcomes of Intra-uterine development.

Researchers who have examined the reasons of steadily unchanged rate of the low birth weight during the last decades concluded that besides the effective medical prenatal care, the importance of socio-economic factors such as maternal education, marital status, income, employment and occupational status, social support, place of residence and interaction among some of these variables is emphasized (4) (8) (14).

Besides the differences in newborns health, according to the maternal medical and biological factors the socio-economic inequalities in perinatal health were recently observed.

In country like India where poverty, illiteracy and low socio-economic factors play a major role, the incidence of very low birth weight and its complications can be reduced by targeting on the socio-demographic, obstetric factors, maternal nutrition and health education.

Sampath Kumar et al (1) from Christian Medical College found that maternal factors comprising of social, obstetric and anthropometric factor are found to influence LBW. In his study he found that age of the mother, parity, gravida, maternal height and maternal weight are associated with LBW. However social factors were not found to be associated with LBW.

Dhar GM et al (10) in his study has pointed out that factors contributing to low birth weight (LBW) include poverty, ignorance, and inability to use health care services. Early marriages and low family income lead to poor maternal nutritional reserves, which lead to reduced fetal nutrition. Poor maternal nutrition is also the result of ignorance, short birth internals, multiparity, and lack of prenatal care. Both heavy manual labour and smoking contribute to placental ischemia, which along with reduced fetal nutrition, leads to IUGR.

Malik S et al (25) in his study found, a strong association between birth weight and maternal height, weight, age, ANC visits and risk status of pregnancy. A short malnourished, young, unregistered or primiparous mother was associated with higher rate of LBW. On multiple regression analysis it was noted that maternal weight, parity and ANC visits independently affected the birth weight of the newborn.

Nair NS et al (31) in his study at Kasturba Medical College, Manipal, on using multiple logistic regression model, primis, elderly mothers and mothers who had not received good quality antenatal care were found to be more at risk of having low birth weight babies. Other significant determinants were family custom, socio-economic status and environmental

sanitation.

Deshmukh JS et al (9) his study found out the prevalence of LBW and its association with maternal factors conducted in Govt. Medical College, Nagpur, including 201 pregnant women from an urban area in Nagpur. Their results were, the prevalence was found to be 30.3%. Multivariate analysis identified the following maternal risk factors for low-birth weight deliveries, anemia, low socio economic status, short birth interval, tobacco exposure, height, maternal age, body mass index and primiparity.

Chhabra et al (5) studied the relation between birth weight and maternal factors like mothers weight, parity and mothers age. On Applying multiple logistic regression analysis, mothers weight and parity alone emerged as significant variables.

N.S. Nair et al (30) have observed that the highest birth weight was seen in neonates born to mothers between 25-29 years. Birth weight improved with improvement in social economic status. In their study there was an apparent tendency towards higher birth weight in christian children, though no definite relationship would be shown between religion and birth weight. It also showed a definite tendency to rise with increasing parity. The birth weight is more with increasing maternal age. Lower birth weights were also related to toxemia of mother.

In a study of preterm babies by **JN Bhalla et al** (3) the following observation were made by authors. The incidence of curtailed pregnancy was higher when maternal age was less than 24 years, being lowest in the age group of 25 - 34 years. Preterm births are lowest among second born babies. Incidence of premature delivery was found to be increased in mothers with toxemia, multiple births and antepartum hemorrhage. In their study 1/6 of the mothers delivering

before terms were anemic and 1/10 had antepartum bleeding 1/4 of cases no cause was available.

Dr.Shanthi Ghosh in editorial of Indian pediatrics of March 1970 (37) following low birth weight babies, has stated that the etiological factors may be fetal, plancetal or maternal. Among the fetal factors, genetic chromosomal, infection, having single umbilical artery and the effect of drugs and radiation are important. Site and size of placenta plays an important role. Among the maternal factors, nutrition of the mother anemia, toxemia and infections are relevant factors. The incidence of moderate to severe anaemia in mothers of LBW infants had been found to be 15.637% compared 2% in mothers of normal weight babies.

Shanthi Ghosh et al have made the following observations. In their study 22.9% of the babies weighed less than 2500, 20.1% of males and 26.0% of females weighed less than 2500 gms.

The incidence of LBW was almost the same in low and but significantly lower in higher income groups. The incidence of LBW was 23.4% among the illiterate group of against 18% in higher educated group.

The incidence of LBW gradually decreased from 34.3% in less than 20 years old mothers to 18.5% in 30-34 years old mothers but thereafter increased again.

42.8% of LBW babies were born to mothers with height less than 140 cms. The incidence of LBW was 42.9% in mothers with weight <35 kg and 12.9% in mothers with weight over 55 kg. Incidence of low birth weight among non anaemic and mild and moderately anemic was 20% compound to 29% among the severely anaemic mothers.

The incidence of low birth weight babies decreased till 4th pregnancy and it increased again. Mean birth weight lowest among primipara. The interval between the present pregnancy and the preceding one, influenced the incidence of low birth weight. Thus the incidence was highest with spacing of less than 2 years and decreases thereafter.

Ndiaye O et al (32) in his study included all women less than 20 years of age for a period of 1 year. It constituted around 10% of the total women registered. They found that the incidence of LBW was around 23%. They identified certain factors were significantly associated with LBW. Low weight gain during pregnancy, fewer antenatal consultation and kidney related syndromes during pregnancy.

They concluded, control and improvement of nutritional behavior during pregnancy; campaigning for a better attendance at antenatal consultation services for the early detection of pathogenesis during pregnancy and for preventing kidney related syndromes.

Dickutte J, et al (11) has statistically analysed the association of birth weight with the indicators of maternal social factors, health behaviour and working conditions. Results were, young <20 and elderly >35 years maternal age, low or primary education and lone mother status increased the risk of delivering LBW. Odds ratio of smoking mothers, alcohol drinking and physically abused mothers to deliver LBW were significant. However, the harmful working conditions were not associated with the higher odds of LBW.

Gama SG et al (13) has studied the role of pregnancy during adolescence as a risk factors to LBW. Results are : LBW was significantly greater among adolescent mothers group of age 15-19, than of age-20-24 years old. Regarding prenatal care, adolescents had lower number of appointments and a higher percentage of no attendance. More than 50% of older

mother had completed high school, but only 31.5% among the younger mothers had the same level of education.

Zhang X, et al (43) identified the risk factor for low birth weight as multiparity, preterm birth, abnormal maternal health status and maternal nutrition, maternal medical conditions during pregnancy and maternal schooling. He also found that distribution of the risk factors for LBW was significantly different between costal, inland and remote areas. LBW was mainly attributed to intrauterine growth retardation in the rural areas, and to multiparity and preterm birth, in addition to IUGR in the urban areas. There was difference in the risk for LBW with preterm births and IUGR.

Maruoka K. et al (27). His study was to identify risk factors for low birth in Japanese infants. The data was collected from questionnaires completed by the parents of 23132 infants who underwent a standardized well baby check up for 1 month old infants. The results of multiple logistic regression analysis showed that the following three factors and the interaction term significantly contributed to low birth weight. History of live born low birth infant, maternal smoking, live birth order and the interaction between maternal smoking and live birth order.

Arif MA et al (2) found that non-registration for antenatal care, maternal weight at delivery <50 kg, antepartum hemorrhage/ preeclampsia, primigravidity and previous small baby was significantly associated with LBW. births. Other risk factors included birth interval and poor maternal and paternal education.

Lawoyin et al (22) in the year 1997 conducted a study based on the relationship between maternal weight gain in pregnancy, Hemoglobin level, stature, antenatal attendance and low birth weight. He observed that mothers who delivered LBW babies gained significantly

less weight in the 3rd trimester and last 4 weeks of term pregnancy when compared with controls who had normal weight babies, who were delivered in the study period. There was no significant difference in the prenatal weight gain in the 2nd trimester for the two groups of mothers. Mothers with LBW babies also had significantly lower Bodymass index at onset of pregnancy and were shorter in height. Mothers who delivered preterm LBW babies had significantly lower hemoglobin levels at delivery when compared with those who had normal weight deliveries.

Roth J. et al (35) in the year 1998 conducted a study on the risk of teen mothers having low birth weight babies. He found that young maternal age alone does not explain the higher rates of low birth weight infant born to adolescent females. Both biological and sociocultural factors, plus lifestyle choices made by adolescents, combine to raise or lower the risk of delivering a low birth weight infant.

He emphasized that the incidence of low birth weight in younger adolescents in part by biological factors such as immaturity of female reproductive systems and inadequate prenatal weight gain. The school health personnel can help reduce the risk of teen mothers of having LBW babies by exerting joint efforts by teachers, students, parents and community organization in implementing healthy lifestyle choices, Postponing first pregnancies and reducing unwanted pregnancies.

Lin RX et al (23) in year 1993 conducted a study on Maternal, medical and obstetric complications as the major risk factors for LBW infants. He emphasized that placental abnormalities, uterine malformations and pregnancy induced hypertension were the main risk factors. He found that preterm delivery occurred more frequently in women with diabetes and

injuries in the third trimester. He found that the risk factors of maternal age, educational background, parental smoking etc were less important than maternal diseases or pregnancy complications. His study indicated prenatal care, started early with regular check ups was most important in preventing prematurity and LBW infant.

Perez Molina et al (34) in 2004 conducted a study on the maternal risk factors and premature birth in a public hospital in Mexico. He found that the maternal risk factors associated with preterm birth were: multiple birth, illness during pregnancy, premature rupture of amniotic membranes, inadequate prenatal care, urinary tract infections, cervicovaginitis, and low socio economic level.

Mondal B et al (28) in the 2000 in Indian statistical Institute Calcutta conducted a study on the risk of factors for LBW. He excluded still and twin birth. The results of univariate analysis revealed that sex, maternal age, parity, gestation period, economic condition and maternal education were significantly related to the incidence of LBW.

Multiple logistic regression analysis revealed that all the above mentioned factors had independent risk for LBW except the economic condition and father's education.

Escobar JA et al (12) in year 2002 conducted a study on risk factors for LBW. His results of multivariate analysis showed a significant association between LBW, the presence of anaemic when the pregnancy was detected, urinary tract infection during pregnancy, smoking while pregnancy a history of previous children with LBW, arterial hypertension since before pregnancy, and inadequate timing of visit for follow-up of initial prenatal care.

AIM AND OBJECTIVE

To evaluate the maternal factors responsible for Very Low Birth Weight newborn.

MATERIALS AND METHODS

Study Design

This prospective case control study was conducted in Govt. R.S.R.M lying in hospital, which is affiliated to Stanley Medical College, during the period from January 2005- December 2005.

Selection Criteria

Inclusion Criteria

All newborns delivered in Govt. R.S.R.M. lying in - hospital and admitted in NICU (Neonatal Intensive Care Unit) with birth weight less than 1500 gms (very low birth weight) irrespective of gestational age were included in the study.

Exclusion Criteria

i. Still births

ii. Multiple pregnancies

iii. Newborns with major congenital anomalies and syndromes.

Control Groups

An equal number of newborns of weight more than or equal to 2500 gm selected by simple randomized technique on the very same day of the selection of study group, irrespective of gestational age.

The RSRM lying-in-hospital is situated in the north Chennai, where poverty, illiteracy, poor sanitation and low socio economic conditions were the major problems.

A well organized Ante-natal clinic is attached to the hospital which provides information about the mother during her pregnancy.

The average stay of the mother and child in this hospital, after an uncomplicated normal delivery is 3 days.

The period of this study was 1 year, from Jan 2005 to Dec. 2005. This is a case - control study involving 224 mother's whose babies weight is less than 1500 gms.

Only mothers of live-born singleton babies with no identifiable major congenital malformations were included in the study.

The definition for live births is given by WHO being "Live birth is the complete expulsion or extraction from its mother of product of conception irrespective of the duration of pregnancy, which after such separation, breathes, or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord or definite movements of voluntary muscles, whether or not the umbilical cord has been cut or the placenta attached, each product of such a birth is considered a live birth.

The factor in the mother which were taken into consideration were.

1. Age
2. Parity
3. Birth interval
4. Height of the mother
5. Weight of the mother
6. Mid arm circumference
7. Literacy of the mother
8. Per capita income per month
9. Family structure
10. Mother's occupation

11. Antenatal care

12. Maternal disease during the antenatal period.

- Anaemia

- Pregnancy induced Hypertension

- Antepartum hemorrhage

- Heart disease complicating pregnancy/ diabetics mellitus, oligohydramnios, UTI and chronic renal disease, viral hepatitis, structural anomalies of uterus and cervix, Hydramnios, Malaria, Brochial Asthma.

13. Bad obstetric history

14. Factor in the newborn were

1. Weight of the newborn

2. Assessment of gestational age of newborn

3. Sex of the child.

Sampling of Newborn

Liveborn singleton infants with birth weight less than 1500 gms without any identifiable major congenital malformation at birth were included in the study.

Birth weight - WHO Definition

The first weight of the newborn obtained after birth. The weight should be measured during the 1st hour of life before significant postnatal weight loss has occurred.

The neonates were weighted naked within 24 hours after delivery in a electronic weighing machine which had the sensitivity of ± 1-5 gms.

Heavy objects like metal forceps for occluding umbilical cord were omitted. Weighing scales were checked at intervals for accuracy and sex of the baby was noted.

The names of the mothers who had delivered infants within the last 24 hrs below 1500 gms were taken from the post partum nominal register in the labour ward. The wards to which they were admitted was noted.

The names of the mothers who had delivered infants within the last 24 hrs below 1500 gms were taken from the post partum nominal register in the labour ward. The wards to which they were admitted was noted.

Assessment of Gestational age of the infant

Gestational age can be assessed by (1) Calculating the expected data of delivery from the last menstrual period. (2) By ultrasound examination.

In this study, the gestational age of newborn was confirmed by using modified. Dubowitz (Ballard) examination for newborns. There are limitations to the method especially with use of the neuromuscular component in sick newborns. It involves mainly 2 factors.

1. Neuromuscular maturity

2. Physical maturity

Both the factors involves six additional factors each which can be easily assessed clinically in newborn. A score of -1 to 5 was given for each additional factor and thereby the total score is calculated. Depending on the total score the gestational maturity of newborn was calculated. New Ballard scoring chart has been mentioned at the back along with the proforma.

After knowing the gestational age of the newborn, they are classified into three groups, (1) preterm average for gestation (2) Term, small for gestation and (3) preterm small for gestation using the graph relating the gestational age and its appropriate weight. The baby is considered small for gestation, if its weight lies below the 10th percentile line in the graph.

Sampling of Mothers

The same procedure used above for locating the infants was also used to trace the mother.

1. Age of the mother was taken as recorded in the case sheet and also by questioning the mothers when data entered in the case sheet was not available.

2. Parity of the mothers was noted down after questioning the mother as also the time interval between the previous delivery and birth of the child under study.

3. Since preterm delivery was the major cause for VLBW infants and most of the maternal weight gain during pregnancy occurs during the later part of the 3rd trimester, pregnancy weight gain was not taken into consideration. Instead of that the weight of the mothers who were registered before 12 weeks of gestation was recorded from the case sheet. This is due to minimal maternal weight change during the 1st trimester.

4. The height of the mother was usually measured within 24 hrs after delivery along with other measurement where their was feasible. If not it was deferred till the mothers were able to stand erect.

Using a non stretchable type of inch tape which was graduated in inches and centimeters, corresponding markings were made against the walls of each of the wards from which sampling was to be done.

The mother's under study were made to stand against the walls with slipperless feet, heels together and touching the wall, back of the shoulders and occiput against the wall, with line of vision parallel with that of the ground. A firm cardboard was placed on the top of their head perpendicular to the marking on the wall and reading corresponding to the lower edge of the cardboard was noted.

5. Mid arm circumference of all the mothers under study was measured within 24 hrs after delivery.

Using a non-stretchable type of instrument the distance between the acromion and the olecranon process of the left arm was measured. The mid point noted. The girth at the level of the midpoint was measured in centimeters. In instances where the mother had generalized anasarca their measurement was deferred until the edema subsided.

6. Literacy of the mother was ascertained by questioning her and her ability to read a write. Based on that her standard of literary were grouped into 3 categories. Illiterate, primary and middle school, high school and above.

7. The total family income and per capita income and family structure was assessed by questioning her in detail about the nature of the employment of the earning member in her family, number of earning members, family size and style of living. Per capita income divided into 3 groups, <500 Rs, 500-999 and Rs.≥ 1000.

Family structure is divided into nuclear and joint family. Nuclear family = Husband, wife, dependent children less than 5 members. Joint family is greater than 5 members.

8. Mother's occupation was ascertained by questioning her about the nature of work and the duration of work. Based on this their occupation status was grouped into 3 categories. House wife, light work (those mothers who work less than 8 hour duration in a shady environment). (Semi proffession, clerical jobs, women working in shops and stalls. Heavy work (those mothers who work more than 8 hrs duration especially under sun). (Unskilled, semiskilled and skilled labourers).

9. The number and the quality of Antenatal care given to the mother was assessed by questioning the mother and crossed checked with the previous consultation records. Based on this they were divided into 3 groups. a. No Antenatal visits, b. Less than 5 visits, c. 5 or more than 5 visits.

10. Maternal diseases during the antenatal period were enquired into and cross checked with case sheet records for

i. Anaemia - with haemoglobin levels less than 9 gram %.

ii. PIH - Blood pressure of more than 140/90 mm of Hg in two consecutive measurements with albuminuria. Signs of eclampsia

iii. APH - Bleeding from the placental site after 28 wks of pregnancy or during the 1st and 2nd stage of labour.

a. Accidental hemorrhage - Bleeding due to premature separation of normally situated placenta.

b. Placenta praevia - Bleeding due to separation of the placenta which is wholly or partially situated in the lower uterine segment.

iv. Diabetes mellitus : It is diagnosed by doing glucose challenge test and glucose tolerance test.

a. Glucose challenge test is done using dex 50 and read after 1 hour. It is considered positive if the blood value is more than 130 mg/ dl and these patients are subjected to glucose tolerance test.

b. Glucose tolerance test is considered positive if fasting blood sugar is more than 105 and postprandial blood sugar is more than 160 (After 2 hours).

v. Heart disease complicating pregnancies. It is diagnosed clinically and confirmed by echocardiogram .

vi. Oligohydramnios: Oligohydramnios can be diagnosed by ultrasound and considered positive if the amniotic fluid index is less than 5.

vii. Viral hepatitis : It is diagnosed by clinical signs like jaundice, fever, anorexia, malaise in the first trimester and abnormal liver function tests.

viii. Urinary tract infections/ renal disorders : Diagnosed by clinical features, urine

culture and sentivity and by ultrasound examination.

ix. Anomalies of cervix and uterus : diagnosed by ultrasound.

x. Hydramnios: Diagnosed by ultrasound and considered positive if the amniotic fluid index is greater than 20.

xi. Malaria: Diagnosed clinically by high grade fever with chills, with or without anemia and hepato splenomegaly and confirmed by peripheral smear study.

xii. Bronchial Asthma or mixed COPD: Diagnosed clinically by recurrence of symptoms of brocho constriction which has a diurnal variations and which gets relieved by taking steroids and bronchodialators

11. Bad Obstetric History: All mother's were enquired and cross checkd with case sheets for BOH.

- Previous abortions
- Previous Intra uterine deaths, Still births
- Previous very low birth weight/low birth weight babies and preterm births.
- Previous neonatal deaths.

1. Gestational age : This is carried out only in study group since control group consists of

babies whose weight is more than or equal to 2500 gms and since most of them are term babies.

RESULTS AND ANALYSIS

A total number of 252 newborns with birth weight less than 1500 gms were admitted in NICU out of 12104 live births in one year. In that 24 are multiple births and 4 had major congenital malformations.

On excluding both multiple births and congenital malformations , only 224 newborns were included in the study for one year.

TOTAL DELIVERIES	TOTAL NO OF VLBW	INCIDENCE %
12104	**252**	**2.08**

The incidence of VLBW newborns was found to be 2.08 %

GESTATIONAL MATURITY OF NEWBORNS < 1500 GRAMS

Gestational age	Count	%
Preterm AGA	166	74.1
Term SGA	36	16.1
Preterm SGA	22	9.8
Total	224	100.0

The most common cause of VLBW is preterm delivery(84 %). In that preterm AGA constitutes 74 % and preterm SGA constitutes 10 %.The remaining 16 % is from term SGA babies (40).

Statistical analysis between study and control group were analysed using Pearson Chi – squared test and the test is considered significant if p value is less than 0.05

Table 1: MATERNAL AGE IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	MOTHERS AGE			TOTAL
	<20 years	21-30 years	>30 years	

VLBW n(%)	58 (67)	150 (46)	16 (44)	224
NBW n(%)	28 (33)	176 (54)	20 (56)	224
TOTAL	**86**	**326**	**36**	**448**

Chi-Square Tests

	Value	**df**	**Asymp.sig (2-sided)**
Pearson Chi-Square	12.983[a]	2	.002

The frequency of very low birth weight babies is more among women aged less than 20 years than mothers with aged more than 20 years. The difference is statistically significant**.**

Table 2: MOTHERS PARITY IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	**GRAVIDA**			**TOTAL**
	PRIMI	**2 & 3**	**>3**	
VLBW n(%)	98 (58)	118 (46)	8 (36)	224
NBW n(%)	70 (42)	140 (54)	14 (64)	224
TOTAL	**168**	**258**	**22**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	8.179[a]	2	.017

The incidence of VLBW is more among primis when compared with the other two groups. The difference is statistically significant.

Table 3: BIRTH INTERVAL IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	BIRTH INTERVAL		TOTAL
	< 2 years	> 2 years	
VLBW n(%)	80 (57)	46 (32)	126
NBW n(%)	58 (43)	96 (68)	154
TOTAL	**138**	**142**	**280**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	18.498[b]	1	.000

In this group 98 primis were excluded from the study group and 70 primis from control group. Mothers with birth interval less than 2 years were found to have more very low

birth weight babies than mothers with birth interval more than 2 years.

Table 4: MOTHERS HEIGHT IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	MOTHERS HEIGHT			TOTAL
	<=140 cm	141-149 cm	=>150 cm	
VLBW n(%)	18 (47)	70 (55)	136 (48)	224
NBW n(%)	20 (53)	58 (45)	146 (52)	224
TOTAL	38	128	282	448

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	1.585[a]	2	.453

There is no correlation found between mothers height and infants with very low birth weight.

Table 5: MOTHERS WEIGHT IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	MOTHERS WEIGHT			TOTAL
	<=40 kg	41-49 kg	=>50 kg	
VLBW n(%)	38 (68)	62 (46)	50 (40)	150
NBW n(%)	18 (32)	74 (54)	76 (60)	168
TOTAL	56	136	126	318

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	12.588[a]	2	.002

Out of 224 mothers in both the groups 150 mothers in study group and 168 mothers in control group were registered before 12 weeks of gestation and others were excluded. It was found that lower the mothers weight higher the incidence of babies with very low birth weight.The difference is statistically significant.

Table 6: MOTHERS MID ARM CIRCUMFERENCE IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	MID ARM CIRCUMFERENCE			TOTAL
	<=20 cm	21-22 cm	>22 cm	

VLBW n(%)	42 (75)	74 (47)	108 (46)	224
NBW n(%)	14 (25)	84 (53)	126 (54)	224
TOTAL	**56**	**158**	**234**	**448**

Chi-Square Tests

	Value	**df**	**Asymp.sig (2-sided)**
Pearson Chi-Square	16.018[a]	2	.000

In mothers with mid arm circumference less than or equal to 20 cm, the incidence of very low birth weight is centpercent.The incidence decreases with an increase in mid arm circumference. This is statistically significant.

Table 7: MOTHERS LITERACY IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	**MOTHERS LITERACY**			**TOTAL**
	Illiterate	**Primary & Middle school**	**High school & Above**	
VLBW n(%)	64 (64)	110 (45)	50 (47)	224
NBW n(%)	36 (36)	132 (55)	56 (53)	224
TOTAL	**100**	**242**	**106**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	10.180[a]	2	.006

There is a significant relation between the educational status of the mother and the childs birth weight.As the literacy rate of the mother increases weight of the baby also increases.

Table 8: PER CAPITA INCOME IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	PER CAPITA INCOME			TOTAL
	<500	500-999	=>1000	
VLBW n(%)	96 (62)	78 (42)	50 (46)	224
NBW n(%)	58 (38)	108 (58)	58 (54)	224
TOTAL	**154**	**186**	**108**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	14.808[a]	2	.001

There is a clear cut relation between the per capita income and the incidence of very low birth weight.As the per capita income decreases the incidence of very low birth weight increases which is statistically significant.

Table 9: FAMILY STRUCTURE IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	FAMILY STRUCTURE		TOTAL
	Nuclear	Joint	
VLBW n(%)	98 (45)	126 (54)	224
NBW n(%)	118 (55)	106 (46)	224
TOTAL	**216**	**232**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	3.576[b]	1	.059

There is no relation found between family structure and the incidence of very low birth weight.

Table 10: MATERNAL OCCUPATION IN RELATION TO NEWBORNS BIRTH WEIGHT.

GROUP	MATERNAL OCCUPATION			TOTAL
	Housewife	Light work	Heavy work	
VLBW n(%)	176 (52)	30 (42)	18 (45)	224
NBW n(%)	162 (48)	40 (58)	22 (55)	224
TOTAL	**338**	**70**	**40**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	2.408 (a)	2	.300

There is no correlation between mothers occupation and very low birth weight.

Table 11: ANTENATAL VISITS IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	ANTENATAL VISITS			TOTAL
	No visits	< 5 visits	=> 5 visits	
VLBW n (%)	8 (57)	90 (54)	126 (47)	224
NBW n (%)	6 (43)	78 (46)	140 (53)	224
TOTAL	14	168	266	448

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	1.880[a]	2	.391

There is no correlation between number of antenatal visits and very low birth weight.

Table 12: MATERNAL DISEASE IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	MATERNAL DISEASES				TOTAL
	PIH	Anemia	APH	Others	
VLBW n (%)	42(57)	26 (42)	14 (58)	32 (52)	114
NBW n (%)	32 (43)	36 (58)	10 (42)	30 (48)	108
TOTAL	**74**	**62**	**24**	**62**	**222**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	3.855[a]	4	.426

Out of 224 mothers, 114 from the study group and 108 from control group were found to have maternal diseases.The remaining 226 mothers from the study and control group were excluded.

Others include

MATERNAL DISEASES	CASES	CONTROL
Oligohydramnios	6	5
Diabetes mellitus	3	6
Heart disease complicating pregnancy	4	2

UTI/Renal disorders	5	4
Hepatitis	3	2
Malaria	4	6
Uterus and cervical anomalies	3	0
Hydramnios	2	3
Bronchial Asthma	2	2

There is no relation between medical diseases complicating pregnancy and the incidence of VLBW. Women with other diseases are less in both study as well as in control group. Further studies are required to evaluate the significance of these maternal diseases with VLBW.

Table 13: BAD OBSTETRIC HISTORY IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	BAD OBSTETRIC HISTORY		TOTAL
	Present	Absent	
VLBW n (%)	46 (72)	178 (46)	224
NBW n (%)	18 (28)	206 (54)	224
TOTAL	**64**	**384**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	14.292[b]	1	.000

There is a strong relation between bad obstetric history in the previous pregnancies and very low birth weight.

Table 14: SEX OF THE BABY IN RELATION TO NEWBORNS BIRTH WEIGHT

GROUP	SEX OF THE BABY		TOTAL
	MALE	FEMALE	
VLBW n (%)	104 (48)	120 (52)	224
NBW n (%)	114 (52)	110 (48)	224
TOTAL	**218**	**230**	**448**

Chi-Square Tests

	Value	df	Asymp.sig (2-sided)
Pearson Chi-Square	.893[b]	1	.345

There is no relation between sex of the baby and childs birth weight.

FACTORS INFLUENCING NEWBORNS BIRTH WEIGHT

Variable	Values	B	S.E.	Wald	df	Sig.	Exp (B)	95.0% C.I.for EXP(B)	
								Lower	Upper

	21 - 30			14.89	2	0.001			
	> 30	2.81	0.87	10.41	1	0.001	16.69	3.02	92.20
Age	< 20	1.35	0.92	2.16	1	0.142	3.87	0.64	23.52
	> 150			10.62	2	0.005			
	141 - 149	-1.86	0.66	7.93	1	0.005	0.16	0.04	0.57
Height	< 140	-0.41	0.62	0.44	1	0.506	0.66	0.20	2.24
	> 22			14.79	2	0.001			
	21 - 22	2.24	0.60	13.87	1	0.000	9.43	2.90	30.74
MAC	< 20	2.23	0.63	12.52	1	0.000	9.27	2.70	31.84
	> 1000			16.15	2	0.000			
	501 - 999	2.12	0.55	14.63	1	0.000	8.34	2.81	24.72
Income	< 500	1.54	0.46	10.98	1	0.001	4.67	1.88	11.60
ANC	No visit	0.87	0.33	6.96	1	0.008	2.38	1.25	4.54
Constant		-6.06	1.35	20.04	1	0.000	0.00		

On applying multiple logistic regression analysis (wald forward) using 5 steps, Maternal factors including Age, Birth Interval, Height, Weight, Midarm Circumference, Education, Percapita income, Type of family and presence of bad obstetrics history influences the Birth weight of newborn.

DISCUSSION

The incidence of low birth weight was considerably decreasing in India over the past years due to increased standard of living of the people, and increased fund allocation for health care by the government. But the incidence of VLBW (less than 1500 gms) is static in nature in our country. It may be due to various factions like socio demographic factors, maternal obstetric factors, anthropometric factors, fetal factors, genetic factors and idiopathic.

In country like India where there is economic constraints the present study was done to find the relationship between socio demographic factors, obstetric & anthropometric factors with very low birth weight so that appropriate measures can be taken to reduce the incidence.

In this study the incidence of very low birth weight is 2.08%. The most common cause of very low birth weight is preterm delivery which is around 84%. In that 74% is constituted by preterm, average for gestational age and 10% by preterm, small for gestational age. The remaining 16% was constituted by term, small for gestational age (40).

In this study the risk of very low birth weight is significantly higher in young mothers (<20 years) which is supported by other studies done by Roth J et al University of Florida 1998 (35). Another study done by Dickute. J et al in year 2000 (11). Lithuania has reported that young mothers less than 20 yrs and older (35 years and above) were related to very low birth weight. This relation is not supported by another study done by Yoder BA *et al* (42)

Sambath Kumar et al (1) in year 1993 March Christian Medical College Tamilnadu had found association between Maternal age & very low birth weight. When compared with the control group the incidence of very low birth weight increased as the mother's age decreased.

There is a significant association of primiparity & very low birth weight in this study. This was supported by various other studies like Sampath Kumar *et al* (1) CMC Vellore, Mallik.S *et al* (25) TN medical College Mumbai 1997. May - June and Nayer, N.S. *et al*

(30) Kasturba Medial College Manipal 2000 January

Dhar GM et al (10), Indian Journal of Maternal Child Health 1991, has found that Multigravida mother's had more very low birth weight babies than primigravida which is against this study.

In this study there was a cent percent association between the birth internal & very low birth weight. The incidence of very low birth weight is high when birth internal is less than 2 years than compared to birth interval more than 2 years. This may be due to a minimum period of 2-3 yrs for the Mother's nutrition & general condition to attain the pre pregnancy level. This is supported by Dhar GM et al (10) Indian J. of Maternal Child Health 1991. This association was also supported by Deshmukh JS et al (19) Indian Pediatrics 1998 January and Shanthi Ghosh et al., (37) Editorial, Indian Pediatrics 1970.

Mothers height has no relation to the birth weight of the child in this study. This is supported by previous studies done by Chhabra P et al (5) (Asia Pac J Public health 2004). The results of previous studies like Malik S. et al (25) Indian J Pediatrics, 1997 and Deshmukh JS et al (19) Indian Pediatrics, 1998 Jan were against this study.

In this study mother's weight showed a significant association with very low birth weight. This incidence of very low birth weight is higher in women weighing less than 40kg when compared to women weighing more than 40 kg. This is supported by Amin N et al (1), Indian J of Pediatrics, 1993 March - April and Chhabra P et al (5), Asia Pac J. Publichealth, 2004.

In this study Mid-arm-circumference of the mother was cent percent related to incidence of very low birth weight (17). Mid-arm-circumference tells the real status of maternal nutrition. The incidence of very low birth weight is high in women with Mid-arm-circumference < 20 cm. This is supported by a previous study done by Zhang X et al, (43) Zhonghua Yu Fang Yi Xue Za Zhi -2002 May & Dhar GM et al, (10) Indian Journal of Maternal & child Health 1991.

Mother's Literacy had a strong relation with very low birth weight in this study. The incidence of very low birth weight is more in mothers who are illiterate than in literate mothers. To imply significance of the literary with very low birth weight further studies are required which involves the father's education, which is not considered in this study due to reduced feasibility. This is supported by previous studies by Dickute J et al (11) Medicine (Kaunas), 2004 and by Mondal B et al (29) Indian J Pediatrics, 2000 July.

Another study done by Chia SE et al (6), Neurotoxicol Teratol 2004 March - April found that Fathers eduction is much more related to very low birth weight than Mother education.

There is a strong relation between per capita income and very low birth weight (7). The incidence of very low birth weight is more when the percapital income is less than 500 per month. This is because nutrition of the mother mainly depends on the percapita income & education. This is supported by Dhar G.M et al (10) Indian J Maternal & Child Health 1991 and Deshmukh JS et al (9), Indian pediatrics 1998 Jan. This was not supported by Amin et al (1), Indian J. Pediatr. 1993 Mar - April.

Family Structure has no relation to very low birth weight. Further studies are required to confirm this association including factors like food taboos, family atmosphere, environmental factors, customs and family cultures etc.,

In this study there is no relation between maternal occupation and very low birth weight infants. This is supported by a previous study done by chia SE et al (6) where mothers occupation has no role in the causation of very low birth weight. Instead fathers occupation has a significant relationship with very low birth weight. Further studies with large study group is needed to confirm this data, since in this study mother's, in heavy work category are less in number. This was not supported by previous studies like Dikute J. et al. (11), Medicine (Kaunas) 2002 and by Dhar GM et al (10), Indian J of Maternal Health 1991.

In this study there is no relation between number of Antenatal visits & incidence of very low birth weight. This may be due to non-consideration of the quality of Antenatal care. This is not supported by previous studies done by Nair NS et al (31), Indian J of Pediatrics, - 2000 Jan.

In this study there is no relation between the incidence of very low birth weight & any of the Maternal diseases. This may be due to associated fetal or genetic factors operating both in Study & Control group (26). This is not supported by various previous studies done by Arif MA et al (2), J Obstet Gynaecol Res. 1998 June, in which there is a strong association exists between Pregnancy Induced Hypertension & Ante Partum Hemorrhage with very low birth weight. Another study conducted by Lawoyin et al. (22), South east Asian J trop Med Public Health 1997 and Deshmukh J. S et al (9), Indian Pediatr 1998. had found a strong association between Anemia & very low birth weight. Another study done by Lin RX et al. (23), Zhonghua Fu Chan, Ke Za Zhi 1993 Jan had found a relation between placenta and uterine problems and Pregnancy Induced

Hypertension with very low birth weight. Ndiaye O, et al (32), Sante, 2001 Oct has found an association between Renal Disorders and very low birth weight.

Even though the percentage of very low birth weight babies is more in mothers with uterine and cervical anomalies, when compared to control group, the significance ratio cannot be attributed because of reduced number of women is both groups.

In this study there is a cent percent relation between Bad obstetric history in previous pregnancies with very low birth weight. The incidence of very low birth weight is more in mother's who had any one of the BOH mentioned before than the control group. This is supported by Maruoka K et al (27), Acta pediatr 1998 March and Arif MA etal (2), J Obstet Gynaecol Res 1998 June.

There is no relation between the sex of the child & very low birth weight. Mondal B et al (28), Indian J. Pediatrics, 2000 July in his study has found a relation between sex of the child and very low birth weight.

SUMMARY AND CONCLUSION

In this study an analysis of 224 mothers whose babies weighing less than 1,500 gms and 224 mother;s whose babies weighing more than 2500 gms was done.

The variables were subjected to a computer analysis using a focus format. The data was analysed using a chi square test. P value were taken from appropriate tables.

Frequency of very low birth weight had a significant association with the following factors in the mother in the order of decreasing relationship.

1. Birth interval: The incidence of very low birth weight is found to be high in mothers with birth interval of less than 2 years.

2. The incidence of very low birth weight was very high in mothers who had any one of the BOH in the previous pregnancies. This may be due to multifactorial reasons.

3. Since maternal nutrition is directly related to Mid arm circumference, mothers MAC with less than 20 cm's has a higher incidence of very low birth weight.

4. Mother's weight is significantly related to birth weight of infants. Mother who weighed less than 40 kg are more prove to give birth to lighter babies.

5. Per capita income is significantly related to very low birth weight. The incidence of very low birth weight increases when the percapita income is less than 500 per month.

6. Mother's age has been strongly related to the incidence of very low birth weight. The incidence of very low birth weight is more in mother's age of < 20 years.

7. The incidence of very low birth weight is very high in primigravida than multi gravida. This may be due to immaturity in female reproductive system and poor adolescent nutrition.

8. The incidence of very low birth weight is high in mother's who are illiterate.
The maternal factors which did not show significant relation to very low birth weight infants are.

1. Maternal height: Though previous studies done by various authors related maternal height to birth weight, in this study there is no significant correlation. This may be due to the fact that most of the mothers in our south Indian population are uniformly short.

2. Family structure has got no relation with the incidence of very low birth weight in this study. Further studies are needed, including factors like family atmosphere, surrounding environmental factors, cultural customs and food taboos, to ascertain the relation between family structure and very low birth weight.

3. Number of Antenatal visits has got no significant relationship with the incidence of very low birth weight in this study. Further studies involving the quality of Antenatal care given to the mother is necessary to confirm the relationship with very low birth weight.

There is no relation between the mother's occupation status and very low birth weight incidence in this study. This may be due to smaller study group.

1. 5. Maternal diseases complicating pregnancy has no impact on the incidence of very low birth weight in this study. This may be due to associated fetal, genetic and idiopathic factors operating both in study and control group.

6. Sex of the baby does not have any relationship with very low birth weight babies.

Birth weight of an infant is determined by a multitude of biological and socio economic factors. Some of them are determined even before conception. A well nourished multiparous mother between 20-30 years with birth interval of more than 2 years with good literacy and without any bad obstetric history has the best chance of producing a good weight baby. To achieve the above goal, concentration should be diverted on female literacy, girl child and adolescent nutrition, Health education, genetic counselling, improving the standard of living, easy availability of health care and early detection and prompt treatment of obstetrical factors. Thus to reduce the incidence of very low birth weight babies action is called for not only in obstetrical field but also in the wider sphere of maternal welfare. And for the law makers, the solution of social problem should become the priority of state health policy.

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PROFORMA

MATERNAL FACTORS IN ASSOCIATION WITH VERY LOW BIRTH WEIGHT BABIES

Mother's Name : Age :

Father's Name :

Address :

LMP :

EDD :

Gravida :

Birth Interval :

Booked / Unbooked :

ANTHROPOMETRIC MEASUREMENTS

Height : Weight at Registration :

Mid Arm circumstance : < 20 / 20 - 22 / > 22

FAMILY OR SOCIOECONOMIC STATUS

Mother's Education : Illiterate / Primary & Middle/ High School and above

Mother's Occupation : Housewife / Light work / Heavy work

Family Structure : Joint / Nuclear

Percapita Income :

WHETHER REGISTERED IN ANC : Yes/ No
If yes < 12 wks / 13-28 wks/>28 wks
No. of Visits : Nil / < 5 / >5

ANTENATAL PERIOD : Drug intake during first Trimester

MEDICAL COMPLICATIONS : Anemia (< 9 gms)
PIH (> 140/90)
APH
DM / Malaria
UTI/ Chronic Renal Disease
Heart Diseases
Viral Hepatitis
TORCH:
Hydramnios /Oligohydramnios
Bronchial asthma.

Any structural anomalies of uterus or cervix :

Any H/s Chronic Drug Intake :

FAMILY HISTORY : Consanguinity
Family Tree
Past Obstetrics History
Any previous abortion : Yes / No
No. of abortions
Induced / Spontaneous
Any Previous H/o LBW or VLBW or preterm births:
Birth Weight/Identifiable cause

Any other Previous
Neonatal complications
Neonatal Deaths
Still birth or dead born

Structural Anomaly of Placenta and Cord Structures:

BABY : D.O.B: T.O.B: M.O.D:

Term/Preterm/Post term

New Ballard Scoring: Gestational age:

APGAR at 5 minutes

MCH/FCH

Singleton / Multiple pregnancy

Birth Weight : < 1000 gms / 1000 - 1500 gms

Any associated external congenital anomaly:

ABBERVATIONS

%	:	Percentage
AGA	:	Average for gestation age
ANC	:	Ante natal care
APH	:	Ante partum hemorrhage
BOH	:	Bad obstetric history
BPD	:	Broncho pulmonary dysplasia
b	:	Beta coefficient
CI	:	Confidence Interval
CMC	:	Christian medical college
COPD	:	Chronic obstructive pulmonary diseases
df	:	Degree of freedom
DIC	:	Disseminated intravascular coagulation
ELBW	:	Extremely Low Birth Weight
Exp (B)	:	Odd's Ratio
HIE	:	Hypoxic ischemic encephalopathy
IUD	:	Intra uterine death
IUGR	:	Intra uterine growth retardation
LBW	:	Low Birth Weight
MAC	:	Mid arm circumference
MDCP	:	Medical disease complicating pregnancy
NBW	:	Normal Birth Weight
NICU	:	Neonatal Intensive Care Unit
	:	Significance
PDA	:	Patent ductus arteriosus
PIH	:	Pregnancy induced hypertension
SGA	:	Small for gestation age

SE : Standard error of β

UTI : Urinary tract infections

VLBW : Very Low Birth Weight

WHO : World health organisation

Wald : test statistics